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10/564,425	01/11/2006	Takaharu Suzuki	90606.80/ok	8036
54/071 7590 07/28/2008 YAMAHA HATSUDOKI KABUSHIKI KAISHA C/O KEATING & BENNETT, LLP 1800 Alexander Bell Drive SUITE 200 Reston, VA 20191				
EXAMINER				
SHEVIN, MARK L				
ART UNIT		PAPER NUMBER		
1793				
NOTIFICATION DATE		DELIVERY MODE		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/564,425

Applicant(s)

SUZUKI ET AL.

Examiner

Mark L. Shevin

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Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 April 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18 and 20-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18 and 20-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Status of Claims

1. Claims 18 and 20-26, filed with Applicants' remarks on April 10th, 2008, are currently under examination. Claims 1-17, 19, and 27-34 are cancelled and claims 18, 21-26 have been amended.

Information Disclosure Statement

2. The international search report for PCT/JP2005/010639 has been received and considered.

Status of Previous Rejections

3. The previous rejection of claim 18 under 35 U.S.C. 102(b) over **Wagner** (Mechanical surface treatments...) in the Office action dated January 10th, 2008 has been **withdrawn** in view of Applicant's amendments to claim 18.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

4. **Claims 18 and 20-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Lutjering** (Gerd Lutjering and James C Williams, *Titanium*, Springer-Verlag, 2003, Section 1.5, Chapter 1 "Introduction", p. 8-11, and Section 3.7, Chapter 3, "Surface Treatment", p. 113-122.

Regarding claim 18 and its amendments, the surface will inherently include a modified surface layer as it was subjected to shot peening to yield large compressive stresses and the instant specification teaches on Page 8-9, para 0045, that the beta

phase in part of the surface region transitions to the alpha phase due to energy input (kinetic and heat) from shot-peening. Lutjering teaches that it is important to select an appropriate shot-peening intensity (kinetic energy) for a given alloy to maximize the benefits of peening (Fig. 3.67) and avoid overpeening that can actually reduce the fatigue life of a titanium part (p. 117, see highlighted text).

Lutjering teaches that surface damage such as nicks, scratches, gouges, or abusive machining in the surface of a titanium part (p. 114, Section 3.7.1) create the risk of unforeseen fatigue failure and presumably one of ordinary skill would reasonably remove these layers by polishing, chemical milling, or any other appropriate surface removal / smoothing technique to yield a smooth surface free of crack initiation sites. In this removal process, one would also be removing a percentage of the surface modified alpha layer, depending on the depth of surface removal (i.e. a deep scratch or more heavily damaged surface would require deeper surface removal and thus more vol% of the modified surface layer would be removed).

Lutjering also teaches that chemical milling is used to remove contaminated material from the surface of titanium parts, such as oxide layers. Removal of such hard, brittle surface layers improves the resistance to crack initiation and fracture (p. 114). Although Lutjering teaches that “chemically milled surfaces are often shot peening to create or restore surface residual compressive stress”, this teaching operates on the assumption that peening will not introduce this same class of surface defects.

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, taking the disclosure of Lutjering as a whole, to shotpeen a

titanium alloy part to produce a compressive stress of at least 270 MPa or more (by altering the peening intensity) with a depth of about 100 microns and to polish, chemically mill, or remove surface material to reduce the vol% of a modified surface layer to 10 vol% or below in view of Lutjering's teaching regarding surface damage, cracks, and nicks. Alternatively, it would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980).

Regarding claims 20-26, these claims are rejected for the same reasons as stated in the previous Office Action mailed January 10th 2008 as the amendments to claims 21-26 only change the claim dependency and not the scope of the claimed subject matter.

Response to Applicant's Arguments:

5. Applicant's arguments filed April 10th 2008 have been fully considered but they are not persuasive.

As a first order of business, Applicants' statements with regards to the telephone interview conducted April 1st, 2008 are accurate and unfortunately an agreement was not reached as to the pending claims.

The international search report has been received and considered as stated at Section 2 above.

Applicants assert (p. 7, para 2) that it is not possible to modify the shot peening pressure to yield a given vol% of the modified layer in the surface region in view of Lutjering and thus Lutjering fails to teach or suggest the claimed limitations of claim 18 (p. 7, para 3).

In response, the Examiner is still not convinced that the instantly claimed titanium alloy part is non-obvious based on the entire record, by a preponderance of evidence, with due consideration of the persuasiveness of any arguments and any secondary evidence (MPEP 2142). Applicants have introduced arguments related to the shot peening pressures and the resultant vol% of the modified layer and that 4 bar pressure would be expected to produced 20-40 vol% per the instant specification at para 0045 (p. 9). In this section of the specification used to support Applicants' line of argument, there is no relation or mention of the peening pressure so the Examiner disagrees that thus "one would expect that a shot peening pressure of 4 bar would obtain a modified layer having a thickness of 20 microns to about 40 microns". From this first point, Applicants extrapolated that higher pressures would lead to thicker, deeper modified layers.

The peening intensity is only one of several important factors in shot peening. Lutjering teaches that surface damage such as nicks, scratches, gouges, or abusive machining in the surface of a titanium part (p. 114, Section 3.7.1) create the risk of unforeseen fatigue failure and presumably one of ordinary skill would reasonably remove these layers by polishing, chemical milling, or any other appropriate surface removal / smoothing technique to yield a smooth surface free of crack initiation sites. In this removal process, one would also be removing a percentage of the surface modified

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alpha layer, depending on the depth of surface removal (i.e. a deep scratch or more heavily damaged surface would require deeper surface removal and thus more vol% of the modified surface layer would be removed).

Applicants assert that in chemically milling a shot peened titanium part that Lutjering teaches that the surface should be shot peened again, thus increase the vol% of the modified layer in the surface region of the titanium part.

In response, Lutjering also teaches that chemical milling is used to remove contaminated material from the surface of titanium parts, such as oxide layers. Removal of such hard, brittle surface layers improves the resistance to crack initiation and fracture (p. 114). Although Lutjering teaches that "chemically milled surfaces are often shot peening to create or restore surface residual compressive stress", this teaching operates on the assumption that peening will not introduce this same class of surface defects.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

-- Claims 18 and 20-26 are finally rejected

-- No claims are allowed

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The rejections above rely on the references for all the teachings expressed in the texts of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588 and fax number is (571) 270-4588. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy M. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Mark L. Shevin/

Examiner, Art Unit 1793

/Roy King/

Supervisory Patent Examiner, Art Unit 1793

July 16th, 2008

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